

Black and White Camera

**KP-M22/M32**

**OPERATION MANUAL**

Please read this operation manual carefully for proper operation, and keep it for future reference.

**Hitachi Kokusai Electric Inc.**

CCD カメラ

**KP-M22/M32**

**取扱説明書**

この取扱説明書には、あなたや他の人々への危害や財産への損害を未然に防ぎ、この機器を安全にお使いいただくために、守っていただきたい事項を示しています。ご使用になる前に、取扱説明書をよくお読みいただき、正しい使い方でご愛用ください。  
お読みになった後も、この機器のそばなどいつも手元に置いてご使用ください。

**株式会社 日立国際電気**

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**Note:**The model and serial numbers of your CAMERA are important for you to keep for your convenience and protection. These numbers appear on the nameplate located on the bottom of the products. Please record these numbers in the spaces provided below, and retain this manual for future reference.

**Model No.** \_\_\_\_\_ **Serial No.** \_\_\_\_\_

## 1. GENERAL

The KP-M22/M32 are compact, lightweight, black and white cameras. The KP-M22 uses the latest high grade 1/2-inch image size CCD and the KP-M32 uses

the high grade 1/3-inch image size CCD. The total pixel number of each CCD is 410,000 (490,000 for CCIR).

## 2. MAJOR FEATURES

- Compact: 29(W)×29(H)×62(D)mm
- Lightweight: 100g approx.
- Variable speed electronic shutter function
- Internal/external synchronization, interlaced/non-interlaced operation
- Frame and field integration modes switchable

## 3. COMPOSITION

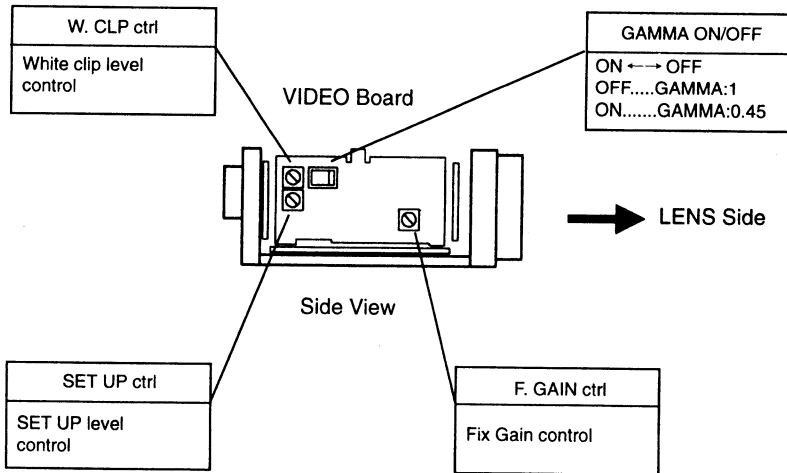
### Standard composition

- (1) Camera body (with IR cut filter)
- (2) Operation manual

### Optional accessories

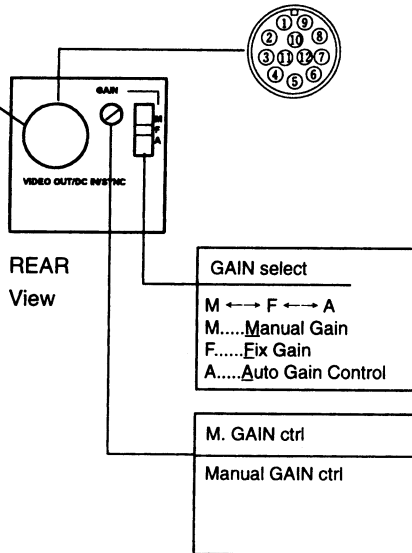
- (1) Lens
- (2) tripod adaptor TA-F3
- (3) 12-pin plug HR10A-10P-12S (01)
- (4) AC adaptor AP-130
- (5) Junction box JU-M1A
- (6) Camera cables
  - 2m: C-201KSM
  - 5m: C-501KSM
  - 10m: C-102KSM

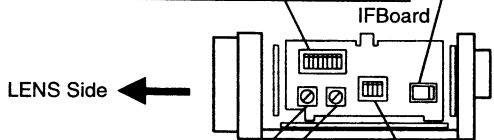
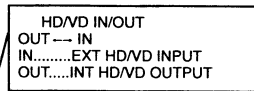
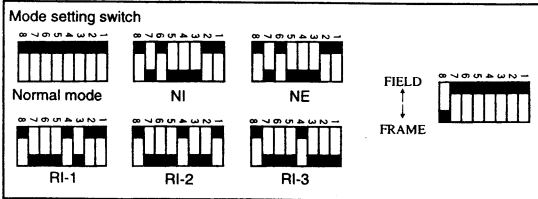
## 4. SECTION NAMES AND FUNCTION



VIDEO OUT/DC IN/SYNC CN  
 VIDEO OUTPUT  
 DC IN:DC12V(11 to 13V)  
 EXT. HD, EXT. VD

Pin No.	Internal sync mode	External sync mode
		HD/VD
1	GND	GND
2	+12V	+12V
3	VIDEO (GND)	VIDEO (GND)
4	VIDEO (Signal)	VIDEO (Signal)
5	—	HD (GND)
6	—	HD (Signal)
7	—	VD (Signal)
8	—	—
9	—	—
10	GND	GND
11	+12V	+12V
12	—	VD (GND)

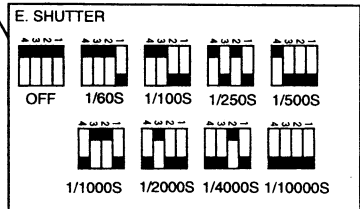




RG ctrl

SUB ctrl

Side View



## 5. CONNECT CABLES

### 5-1 Basic connection

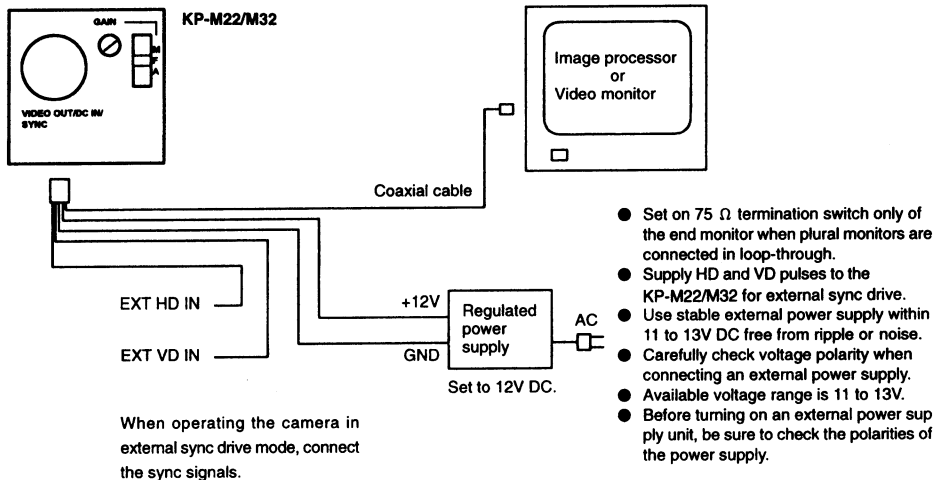
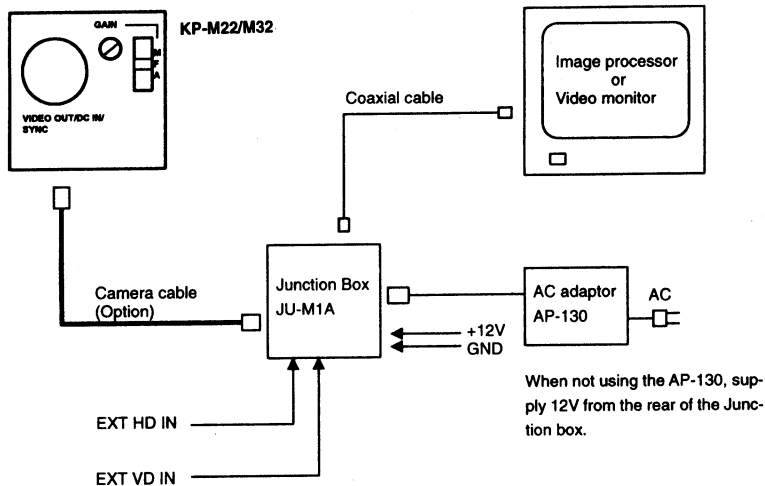


Fig. 2

## 5-2 Connection of options



When operating the camera in external sync drive mode, connect the sync signals.

Fig. 3



## 9. FIELD ON DEMAND

The field on demand function captures a moving object at a desired exposure time by supplying a trigger pulse input at a desired timing. The function is effective for showing the moving object at the same position of the screen. The KP-M22/M32 cameras have 5 modes. However, the output of 1 field is obtained at 1 trigger pulse.

Set the interface (IF) board switch when using the field on demand function. Refer to switch setting of Section 5.

### • NI trigger mode

Exposure starts at the rising edge of one trigger pulse input and ends at the falling edge. The video output of the next field is obtained at the end of exposure. (Vertical sync is not reset.)

The pulse width equals the exposure time.

#### Trigger ratings

High  $5 \pm 0.5V$

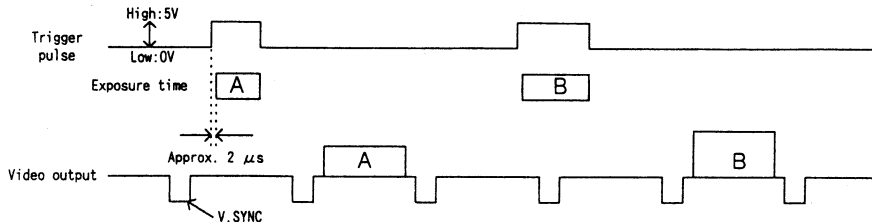
low  $0 \pm 0.5V$

High period More than  $8 \mu s$

#### Note :

Observe the sync signal is free of noise.

Apply the one trigger pulse so that the falling edge occurs only once per field.



### • NE trigger mode

The NE trigger mode is suitable for operating the field on demand function with external sync. Refer to Section 9 for the external sync signal input waveform.

When one trigger pulse input is applied, exposure begins at the pulse rising edge and ends at the pulse falling edge.

The video output of the next field is obtained at the end of exposure. (Vertical sync is not reset.)

The pulse width equals the exposure time.

#### Trigger ratings

High  $5 \pm 0.5V$

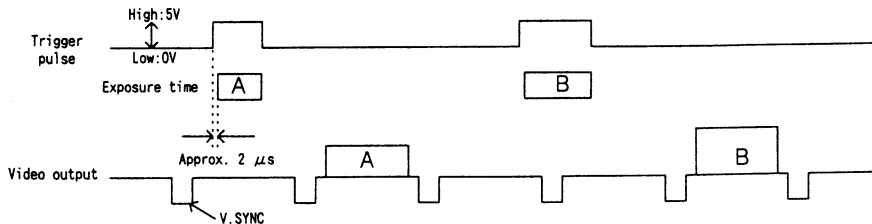
low  $0 \pm 0.5V$

High period More than  $8 \mu s$

#### Note :

Observe the sync signal is free of noise.

Apply the one trigger pulse so that the falling edge occurs only once per field.



### • RI-1 trigger mode

When one trigger pulse input is applied, exposure begins at the pulse rising edge and ends at the pulse falling edge. The video output is obtained 1.08 to 1.1121 ms (EIA) or 1.504 to 1.53 ms (CCIR) after the pulse falling edge. Although V sync is reset at the trigger pulse falling edge, immediately after reset, V sync is absent from the video output. The pulse width equals the exposure time.

Trigger ratings

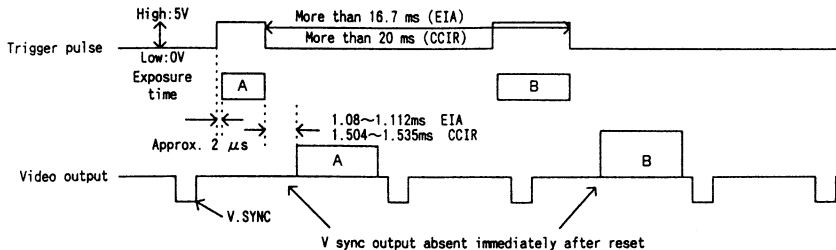
High  $5 \pm 0.5V$

low  $0 \pm 0.5V$

High period More than  $8 \mu s$

#### Note :

Observe the sync signal is free of noise.



• RI-2 trigger mode

The RI-1 trigger mode video output sync component is the horizontal drive (HD) signal. Vertical sync is absent from the video output.

Trigger ratings

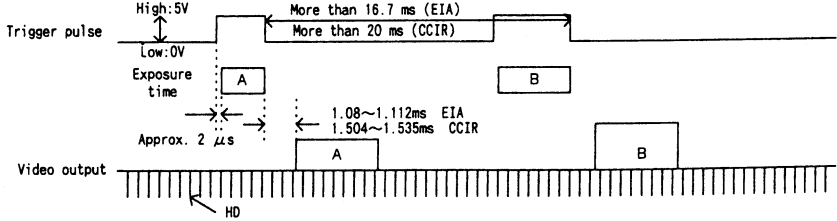
High  $5 \pm 0.5V$

low  $0 \pm 0.5V$

High period More than  $8 \mu s$

Note :

Observe the sync signal is free of noise.



### • RI-3 trigger mode

The inverted HD signal appears during the RI-2 mode trigger pulse High period. Vertical sync is absent from the video output.

Trigger ratings

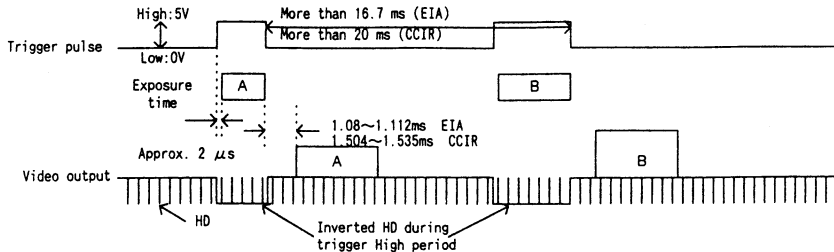
High  $5 \pm 0.5V$

low  $0 \pm 0.5V$

High period More than  $8 \mu s$

#### Note :

Observe the sync signal is free of noise.



## 6. OPTICAL SYSTEM

### 5-3 Camera cable

Cables dedicated for connecting the camera head and the junction box JU-M1A are available as option.

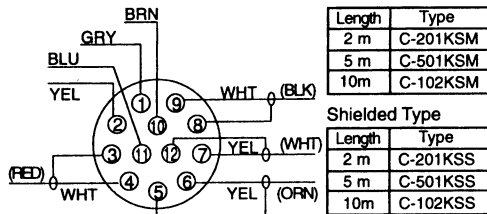
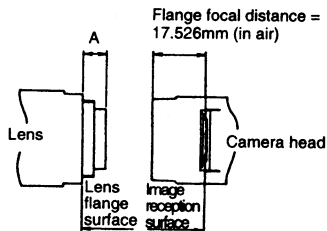


Fig. 4

- Voltage drop due to a cable is about 0.01V per meter.
- The H phase delays by about 5ns per meter.
- When using a cable only to supply power, use the C-201KSM (2m) cable.

- Image size: 1/2, 1/3-inch
- The flange focal distance is 17.526mm (in air).
- Flange focal distance cannot be adjusted.



**Note:**

Select such a lens as the length (A) from the flange surface of the lens to the end of the screw side is 8mm or less.

Fig. 5

## 7. OPTICAL FILTER

This camera is provided with an IR cut filter.

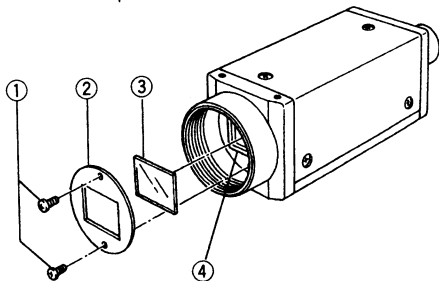


Fig. 6

### IR cut filter removal

- (1) Remove two screws ① shown in Fig. 6, and filter holder ② will come off.
- (2) Remove the IR cut filter ③ from filter frame ④.
- (3) Reinstall and secure filter holder ② with two screws ①.

### Caution

Prior to removing the optical filter, be sure to turn off the power.

## 8. EXTERNAL SYNCHRONIZATION (2:1 INTERLACED)

When operating the camera by external drive signals, connect sync drive signals (HD,VD) to the DC IN/SYNC connector, then the mode is automatically switched from the internal sync mode to the external sync mode.

- Input signals

HD and VD signals

(2:1 Interlace)

HD :  $f(H)=15.734\text{kHz} \pm 1\%$

VD :  $f(V)=59.94\text{Hz} [f(V)=f(H) \div 262.5]$

(Non-Interlace)

VD :  $f(V)=f(H) \div (262 \pm 2)$  (Hz)

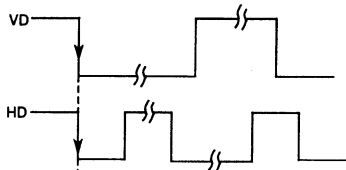
- Input level

HD 2 to 6Vp-p, negative

VD 2 to 6Vp-p, negative

- Input impedance 1k ohms

- Phase relationship between horizontal drive signal (HD) and vertical drive signal (VD)

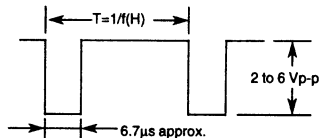


Adjust the phases so that the falling edges of HD and VD are in phase ( $0 \pm 5\mu\text{s}$ ).

Fig. 8

- Input waveforms

- Horizontal drive signal (HD)



- Vertical drive signal (VD)

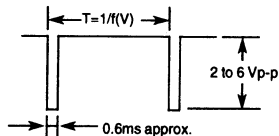
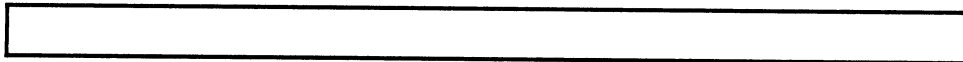


Fig. 9



## 9. SPECIFICATIONS

- (1) **Imaging device:** Interline transfer CCD  
 Total number of pixels EIA: 811(H)×508(V)  
 CCIR: 795(H)×596(V)
- Pixel pitch KP-M22 EIA: 8.4mm(H),  
 9.9μm(V)  
 CCIR: 8.6μm(H),  
 8.3μm(V)  
 KP-M32 EIA: 6.35μm(H),  
 7.4μm(V)  
 CCIR: 6.5μm(H),  
 6.25μm(V)
- Number of effective pixels EIA: 768(H)×494(V)  
 CCIR: 752(H)×582(V)
- (2) **Imaging area:**  
 KP-M22 EIA: 6.45mm×4.84mm  
 CCIR: 6.47mm×4.83mm  
 (1/2-inch size)  
 KP-M32 EIA: 4.88mm×3.66mm  
 CCIR: 4.89mm×3.64mm  
 (1/3-inch size)
- (3) **Signal system:** Based on EIA or CCIR system(at normal operation)
- (4) **Lens mount:** C mount
- (5) **Flange focal distance:** 17.526mm
- (6) **Horizontal scanning frequency:** EIA: 15.734kHz  
 CCIR: 15.625kHz
- (7) **Vertical scanning frequency:** EIA: 59.94Hz  
 CCIR: 50Hz
- (8) **Sync system:** Automatic switching between internal sync and external sync modes
- (9) **Internal sync scanning system:** 2:1 interlaced  
 Number of horizontal lines EIA: 525 TV lines  
 CCIR: 625 TV lines  
 $f(v)=2f(h)/525(625 \text{ for CCIR})$
- (10) **External sync input**  
 HD/VD: 2 to 6Vp-p  
 Input impedance: 1k ohms  
 Frequency deviation: ±1%
- (11) **Number of horizontal lines within range where external synchronization is possible**  
 2:1 interlaced EIA:  
 521 to 2047 TV lines/2 fields(1 field: 61 to 15Hz)

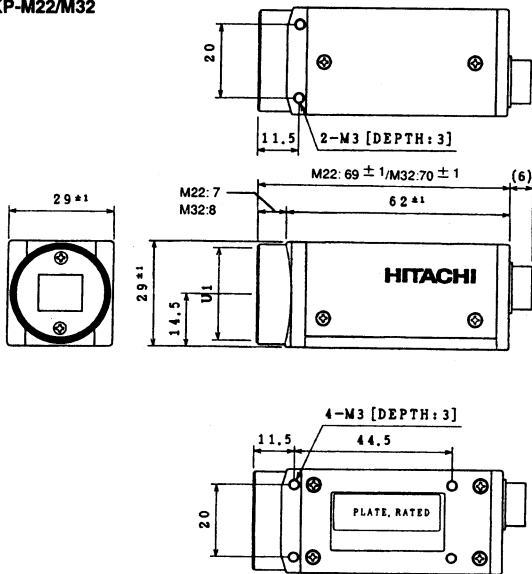


	CCIR: 621 to 2047 TV lines/2 fields(1 field: 51 to 15Hz)		
Non-interlaced	EIA: 260 to 1023 TV lines/field (1 field: 61 to 15Hz)		
	CCIR: 310 to 1023 TV lines/field (1 field: 51 to 15Hz)	(17) <b>Electronic shutter:</b>	High speed shutter mode(8 step) OFF(normal exposure) Set to OFF at the factory.
(12) <b>Video output:</b>	1.0Vp-p, 75 ohms, unbalanced	(18) <b>Integration mode:</b>	Field or frame integration mode Set to frame integration mode at the factory.
	Video: 0.7Vp-p	(19) <b>Gamma correction:</b>	Gamma=1.0 or correction Set to 1.0 at the factory.
	Sync: 0.3Vp-p, negative	(20) <b>AGC:</b>	Fixed gain or AGC Set to fixed gain at the factory.
(13) <b>Horizontal resolution</b>	EIA: 570 TV lines	(21) <b>Power requirement:</b>	12V DC $\pm$ 1V
	CCIR: 560 TV lines	(22) <b>Power consumption:</b>	120mA approx.
Vertical resolution	EIA: 485 TV lines	(23) <b>Ambient temperature and humidity</b>	
	CCIR: 575 TV lines	Operating	-10 to 50°C, 90% RH or less
(14) <b>Sensitivity:</b> KP-M22	400 lx, f8, 3200K	Full specification	0 to 40°C, 50 to 70% RH
	KP-M32 400 lx, f5.6, 3200K	Storage:	-20 to 60°C, 70% RH or less
(15) <b>Minimum illumination:</b>	0.3 lx, f1.4, AGC and GAMMA: ON, without IR cut filter		
(16) <b>S/N:</b>	56dB		

- 
- (24) **Anti-vibration:** 98m/s<sup>2</sup>(10 to 60Hz,  
amplitude: 0.98 mm  
constant, 60 to 200Hz,  
amplitude: variable)  
(10 to 150Hz sweep: 1min,  
XYZ, 30 min.)
- (25) **Resistance to shock** 686m/s<sup>2</sup>  
(Drop test, once each top,  
bottom, left and right)
- (26) **Dimensions:** 29(W)×29(H)×62(D) mm
- (27) **Mass:** 100g approx.

# 10. EXTERNAL VIEW

Camera KP-M22/M32



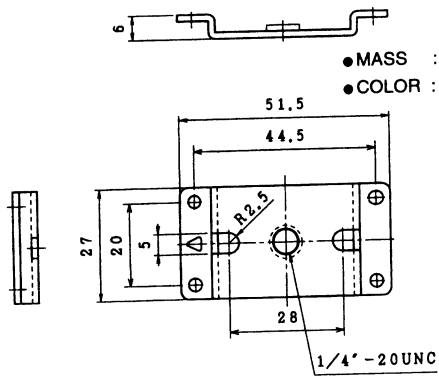
MASS : Approx. 100g

Color : BLACK

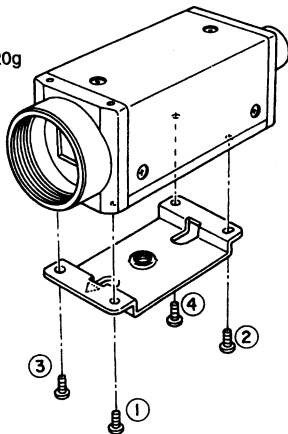


Unit : mm

## Tripod adaptor TA-F3 (Option)



- MASS : APPROX. 20g
- COLOR : BLACK

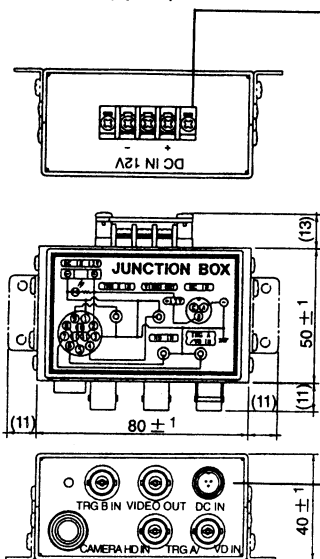


• UNIT : mm

### Installation

1. Attach the TA-F3 tripod adaptor to the camera by using the screws supplied with the adaptor.
2. Refer to the figure and insert the screws in the sequence 1-4 as indicated.

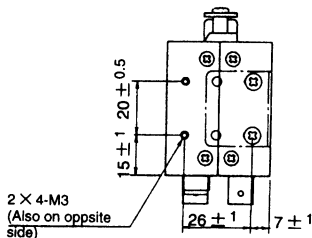
## Junction box JU-M1A(option)



Connect power supply to these terminals when the AP-130 is not used.

### Notes:

- Supply voltage ranged 11 to 13V.
- Make sure of the voltage polarity before connecting an external power supply.
- Use an external power supply other than the AP-130 at your own risk.



Connect the AC adaptor AP-130 to this connector.

Mass : Approx. 200g